

Long-term results of young patients with acute coronary syndrome undergoing coronary stent implantation

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Abstract: Long-term follow-up studies on young patients with acute coronary syndrome (ACS) undergoing coronary stent implantation are relatively scarce. This study was applied to review the long-term results of young ACS patients who had undergone coronary stenting in our hospital. One hundred and two young patients with ACS underwent coronary stent implantation in our hospital. In this study, inpatient records and long-term data of the 102 patients were comprehensively collected for analysis. Major gender of the young patients was men. Most of the patients had smoking, and each patient had at least one risk factor. During hospitalization, no patient died. At last follow-up, all patients were alive and the occurrence rate of major adverse cardio/cerebrovascular accidents was 4.9%. In summary, long-term follow-ups revealed extremely satisfactory outcomes in young ACS patients after coronary stent implantation. Smoking and traditional ACS risk factors are the leading causes of ACS in young population.

Keywords: Acute coronary syndromes, percutaneous coronary intervention, young patients.

INTRODUCTION

In recent years, with the gradual westernization of lifestyle, decrease in physical activities, adverse lifestyle, and other factors, the incidence rate of acute coronary syndrome (ACS), which was previously considered as a geriatric disease, has shown an increasing trend among the young population (Cahil *et al.* 2015; Zheng *et al.* 2015). Previous studies have demonstrated that young patients with ACS had relatively good prognosis (Awad *et al.* 2013; Meliga *et al.* 2012). However, most of these reports were published before the wide application of percutaneous coronary interventions with stent implantation (PCI-S) (Awad *et al.* 2013; Meliga *et al.* 2012). Currently, PCI-S has become increasingly common in the treatment of young ACS patients in clinical practice because of the decrease in stent price, improvement in stent production technology, and gradual maturation of stent implantation techniques (Awad *et al.* 2013; Meliga *et al.* 2012). However, very few studies followed up the young ACS patients after PCI-S. In addition, the knowledge gained from elderly ACS patients could not be simply applied to young patients because the risk factors of ACS differ between the young and elderly populations (Cahil *et al.*, 2015; Liu *et al.*, 2013; Zheng *et al.* 2015). Therefore, this study was designed to review the long-term results in young ACS patients after PCI-S using the -term follow-up data obtained from our hospital.

MATERIALS AND METHODS

From January 2010 to December 2013, 102 young ACS patients age from 27 to 40 were admitted into our hospital and underwent PCI-S (drug-eluting stents were used in all

cases). Inpatient records and follow-up data of the 102 patients were collected comprehensively for analysis. The inpatient records included patient information such as age, sex, medical history, ACS risk factors, medication before hospitalization, angiographic results, information on stents implanted, main cardio/cerebrovascular adverse events during hospitalization, and discharge medication orders. Long-term follow-up data included oral anti-coagulant medications, main cardio/cerebrovascular adverse events, and incidence of in-stent thrombosis after discharge (Bi *et al.* 2015; Chen *et al.* 2015; Fu *et al.* 2015; Jia *et al.* 2015; Jiao *et al.* 2015; Ilter *et al.* 2015; Ren *et al.* 2015; Zhang *et al.* 2015; Zhou *et al.* 2015; Zhao *et al.* 2015; Zhu *et al.* 2015). The latest follow-up was in July 2016. The definition of in-stent thrombosis has been defined in detail in literature (Kim *et al.* 2015; Lin *et al.* 2015; Park *et al.* 2015; Shlomai *et al.* 2016; Su *et al.* 2015; Tsai *et al.* 2015; Yan *et al.* 2015).

SPSS 14.0 was used for statistical analysis. Measurement data with normal distribution were expressed as $\bar{x} \pm s$ and those with skewed distribution were represented using median.

RESULTS

One hundred and two patients were reviewed and were predominantly male (table 1). Nearly 100% patients were active smokers, and all patients had traditional ACS risk factors. A small portion of patients had diabetes. The most common ACS type was STEMI, 43.1% of the patients were NSTEMI. Three patients had a history of rheumatic diseases.

The majority of patients had single-vessel lesion, mostly at the left anterior descending artery (table 1). During hospitalization, no patient died or had stroke.

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Table 1: Baseline clinical characteristics of patients

Characteristic	Patients
Age (years)	41 (27-40)
Male: Female	79: 23
Medical history	
Hypertension	98
Hypercholesterolemia	75
Diabetes mellitus	12
Active smokers	98
Renal failure	11
Clinical presentation	
ST-segment elevation MI	58
non-ST-segment elevation MI	44
Multivessel coronary disease	23
Medications at discharge	
Statins	101
Beta blockers	98
Angiotensin-converting enzyme inhibitors	97
Angiotensin receptor blockers	100
Clopidogrel	100
Aspirin	98

Table 2: follow-up data of patients

Characteristic	Patients
Median follow-up (days)	780 days
Death	0
Myocardial infarction	5
Repeat PCI-S	3
Coronary artery bypass grafting	2
Definite stent thrombosis	2

In this study, the median follow-up time was 780 days, and no patients died during the follow-up period (table 2). Within the follow-up period, five patients had myocardial infarction, of which three underwent repeat PCI-S and two underwent coronary artery bypass grafting (CABG). Definite stent thrombosis occurred in two patients. No patient had stroke.

DISCUSSION

Young ACS patients requiring PCI-S usually have multiple cardiovascular risk factors. In the present study, the majority of the patients had risk factors such as smoking, hypertension and hypercholesterolemia, and each patient had at least one risk factor. However, only a few patients had intervened on these controllable risk factors. This might be attributed to insufficient knowledge on ACS of patients and non-cardiovascular physicians because young people tend to believe themselves to be “healthy” and that ACS is relatively clinically rare in youth. In this study, only less than 5% of patients had ever used antihypertensive drugs or cholesterol-lowering drugs prior to hospitalization. Angiographic results in young patients were also similar to that of elderly

patients, showing mainly left anterior descending artery lesion. This indicates that prevention of ACS in youth should start from the correction of unhealthy lifestyles and early intervention on risk factors, including smoking cessation, appropriate amount of physical activities, lowering blood pressure and cholesterol, etc (Kowgier *et al.* 2015; Makki *et al.* 2015; Othman *et al.* 2015; Quatromoni *et al.* 2015; Sandri *et al.* 2015; Smithers *et al.* 2015).

The follow-up results showed that young ACS patients had excellent prognosis after PCI-S, as evidenced by the fact that no patient died in the series. The rate of revascularization and the incidence rate of major adverse cardio/cerebrovascular events were also relatively low. Through an extensive review of domestic/international literature, we found that long-term follow-up studies on young ACS patients were mostly published before the wide application of stent implantation and some patients in these previous reports underwent CABG. However, the long-term follow-up result of the patients in the present study is superior to that of the patients treated with CABG, indicating an excellent long-term outcome in young ACS patients after PCI-S.

The highly satisfactory long-term follow-up results in this study can also be partly attributed to the persistent administration of oral anticoagulant drugs (aspirin and clopidogrel) after discharge. Because peptic ulcer was relatively rare in young ACS patients, long-term use of oral anticoagulant medications is less likely to cause gastrointestinal bleeding. As a result, young patients could adhere to long-term use of oral anticoagulant medications. On the contrary, due to concerns about existing co morbidities, gastrointestinal bleeding and other risks caused by long-term anticoagulant medications, long-term intake of oral anticoagulant medications is very difficult for elderly ACS patients.

Previous research indicated that up to 76% to 90% of young ACS patients had a history of smoking, whereas the proportion of smoking in elderly ACS patients is 40%. A large sample study showed that compared with non-smokers, the risk of development of coronary atherosclerotic heart disease is higher. This indicates that compared with elderly ACS patients who have uncontrollable risk factors (e.g., old age), ACS in youth can be prevented and controlled. Recent study showed that the mortality rate in patients with coronary atherosclerotic heart disease who had quit smoking was 36% lower than those who continued smoking.

CONCLUSION

The long-term follow-up outcomes in young ACS patients after PCI-S are extremely satisfactory. Smoking and traditional ACS risk factors are the leading causes of ACS in youth, which should be actively intervened clinically to reduce the occurrence of ACS in youth.

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